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# Household Finances and the ‘Big Five’ Personality Traits

**Abstract:** Using data drawn from the British Household Panel Survey, we analyse the relationship between personality traits and financial decision-making focusing on unsecured debt and financial assets. Personality traits are classified according to the ‘Big Five’ taxonomy: openness to experience, conscientiousness, extraversion, agreeableness and neuroticism. We explore personality traits at the individual level and also within couples, specifically the personality traits of the head of household and personality traits averaged across the couple. We find that certain personality traits such as extraversion are generally significantly associated with household finances in terms of the levels of debt and assets held and the correlation is often relatively large. The results also suggest that the magnitude and statistical significance of the association between personality traits and household finances differs across the various types of debt and assets held in the household portfolio.

October 2014

## 1. Introduction and Background

Over the last three decades, there has been increasing interest in household finances in the economics literature (see Guiso et al., 2002, for a comprehensive review). In general, economists have focused on specific aspects of the household financial portfolio such as debt (see, for example, Brown and Taylor, 2008), the demand for risky financial assets (see, for example, Hochguertel et al., 1997) and savings (see, for example, Browning and Lusardi, 1996). One area, which has attracted limited interest in the existing literature on household finances, concerns the relationship between household finances and personality traits. In contrast, the implications of personality traits for economic outcomes such as earnings and employment status have started to attract the attention of economists (see, for example, Caliendo et al., 2012, and Heineck and Anger, 2010). It is apparent that personality traits may influence financial decision-making at the individual and household level including decisions regarding debt acquisition and the holding of financial assets.

In a recent comprehensive survey on personality psychology and economics, Almlund et al. (2011), who explore the role of personality traits as both predictors and causes of economic outcomes, interpret measured personality as a construct derived from an economic model comprising preferences, constraints and information. They discuss how the five factor theory in personality psychology focuses on the role of personality traits in leading to outcomes and the actions taken by agents, whereby individuals learn about their traits resulting in an evolving information set.<sup>1,2</sup>

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<sup>1</sup> They also review the small yet growing literature linking preferences and personality such as the relationship between risk aversion and openness to experience (see, for example, Dohmen et al., 2012) and the relationship between risk aversion and neuroticism (see, for example, Borghans et al., 2008).

<sup>2</sup> One important issue concerns the measurement of personality traits. The Big Five personality trait taxonomy developed by Costa and McCrae (1992), which has been widely used to classify personality traits in the psychology literature and is being increasingly used in economics, classifies individuals according to five factors: openness to experience, conscientiousness, extraversion, agreeableness and neuroticism (emotional instability). Almlund et al. (2011), p. 18, comment that “the Big Five factors

Some preferences and attitudes have been identified as important determinants of specific aspects of household finances in the existing literature. In the context of saving, for example, Lusardi (1998) explores the importance of precautionary saving exploiting U.S. data on individuals' subjective probabilities of job loss from the Health and Retirement Survey. Evidence in favour of precautionary saving is found for a sample of individuals who are close to retirement. In a similar vein, Guariglia (2001) uses the British Household Panel Survey (BHPS) to ascertain whether households save in order to self-insure against uncertainty. Households are found to save more if they are pessimistic about their future financial situation.

With respect to debt, Brown et al. (2005) analyse British panel data and find that financial expectations (i.e. whether individuals are optimistic or pessimistic about their future financial situation) are important determinants of unsecured debt at both the individual and the household level, with financial optimism being positively associated with the level of unsecured debt. More recently, Brown et al. (2008) report a similar positive relationship between optimistic financial expectations and the level of secured, i.e. mortgage, debt, whilst Brown et al. (2013) find that attitudes towards risk are important determinants of household debt with risk aversion being inversely related to the level of debt accumulated by households.

To date, as indicated above, the related research in household finances has tended to explore the influence of one particular attitude of individuals, such as expectations or attitudes towards risk and, in addition, one aspect of household finances such as debt or saving. In contrast, we focus on the more holistic concept of personality traits and a wide range of aspects of household finances. Specifically, we explore the relationship between household finances (including liabilities and assets)

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represent personality traits at the broadest level of abstraction.” See Almlund et al. (2011) for a discussion of the alternatives to and criticisms of the Big Five approach.

and personality traits as classified by the Big Five taxonomy in order to further our understanding of the determinants of household finances. Thus, our analysis will potentially identify influences on household finances, which to date have not attracted much attention in the economics literature, as well as serving to ascertain whether the effects of economic and financial factors remain after controlling for these typically unobserved characteristics. If personality traits are found to be correlated with financial decision-making, then this sheds further light on the nature of financial portfolios held by individuals, thereby exploiting the potential predictive role of personality traits.<sup>3</sup>

Our empirical results suggest that certain personality traits are associated with the amount of unsecured debt and financial assets held by households. Specifically, we find that personality traits such as extraversion and openness to experience are generally strongly correlated with personal finances in terms of the levels of debt and assets held. In contrast, focusing on financial assets, personality traits such as conscientiousness and neuroticism appear to be less important. With respect to the types of debt and assets held, our results suggest that the association with personality traits differs across the various types of debt held, whilst, in general, no association is found with the probability of holding different types of financial assets, with the exception of stocks and shares.

## **2. Data and Methodology**

### **Data**

Our empirical analysis is based on the BHPS, a survey conducted by the Institute for Social and Economic Research comprising approximately 10,000 annual individual

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<sup>3</sup> Furthermore, Almlund et al. (2011) conclude that measured personality traits can be influenced by education, parental investment and interventions. Such a possibility potentially identifies new ways to enhance the financial literacy and decision-making of individuals which may help to alleviate issues related to financial vulnerability and distress.

interviews. For wave one, interviews were carried out during the autumn of 1991. The same households are re-interviewed in successive waves – the last wave being 2008.<sup>4</sup> Information is gathered relating to adults in the household. Information on the personality traits of individuals, is however, only available in one wave relating to 2005 – hence in the empirical analysis which follows personality traits are time invariant.<sup>5</sup> Individuals are asked to rate themselves on a seven point scale from ‘does not apply’, which takes the value of 1, to ‘applies perfectly’, which takes the value of 7, according to three statements relating to each of the five personality factors. Hence, there are 15 questions in total, which are detailed in the table below.

Big Five Personality Traits	BHPS Statements
1. Conscientiousness	1. I see myself as someone who does a thorough job. 2. I see myself as someone who tends to be lazy.* 3. I see myself as someone who does things efficiently.
2. Extraversion	1. I see myself as someone who is talkative. 2. I see myself as someone who is outgoing, sociable. 3. I see myself as someone who is reserved.*
3. Agreeableness	1. I see myself as someone who is sometimes rude to others.* 2. I see myself as someone who has a forgiving nature. 3. I see myself as someone who is considerate and kind to almost everyone.
4. Neuroticism	1. I see myself as someone who worries a lot. 2. I see myself as someone who gets nervous easily. 3. I see myself as someone who is relaxed, handles stress well.*
5. Openness to experience	1. I see myself as someone who is original, comes up with new ideas. 2. I see myself as someone who values artistic, aesthetic experiences. 3. I see myself as someone who has an active imagination.

Note: \* denotes that the score relating to this statement has been reversed.

We follow the standard approach in the literature and create the standardized Cronbach alpha reliability index in order to assess the internal consistency of the three items within each personality dimension.<sup>6</sup>

In the psychology literature, it has been argued that the personality traits included in the Big Five taxonomy are stable over the life cycle (see, for example,

<sup>4</sup> The BHPS was replaced by Understanding Society in 2009.

<sup>5</sup> This may not be problematic if personality traits are stable over time.

<sup>6</sup> The minimum alpha value is 0.7. An alternative approach to obtain an overall value for each personality trait would be to use factor analysis. The results which follow are generally consistent to employing this alternative strategy.

Caspi et al., 2005 and Borghans et al., 2008). There is however still some debate in the literature. For example, Almlund et al. (2011) conclude that personality traits do change over the life cycle. The sample of individuals analysed may also be of relevance. Indeed, Cobb-Clark and Schurer (2012, 2013) argue that non-cognitive skills as measured by the Big Five are stable amongst working age adults and “may be seen as stable inputs into many economic decisions,” (Cobb-Clark and Schurer, 2012, p.14). We follow their approach and focus on adults aged 25 to 59 years old.<sup>7</sup>

In contrast to the information on personality traits, detailed information on finances is available in three waves of the BHPS, namely 1995, 2000 and 2005. Hence, we analyse an unbalanced panel of data drawn from the 1995, 2000 and 2005 waves of the BHPS, including individuals aged between 25 and 59, with personality traits, which are only measured at 2005, being time invariant in the panel. In the empirical analysis, we consider two different samples: firstly, households comprising a couple; and secondly, households comprising a single adult. For the sample based on couples, the two individuals who constitute the couple are the head of household and their spouse. This yields a sample of 2,595 couples and 4,225 observations, where the minimum (maximum) number of times that the same couple is in the BHPS is 1 (3) times and 32% of couples are in the panel at each wave when information on unsecured debt and financial assets is collected, i.e. 1995, 2000 and 2005. For the sample of single individuals, the person of reference is the head of household and the sample comprises 1,966 individuals and 2,915 observations, where the minimum (maximum) number of times an individual is in the BHPS is 1 (3) times and 21% of individuals are in the panel at each point when information on unsecured debt and financial assets is collected, i.e. 1995, 2000 and 2005.

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<sup>7</sup> We explore the issue of the stability of personality traits in the context of our data in detail in Appendix A and find evidence in support of stability.

Our analysis of two distinct samples allows us to explore whether the relationship between personality traits and household finances differs across these two types of household. Furthermore, in the sample comprised of couples, we investigate average personality traits within the couple as well as the association between the head of household's personality traits and the household portfolio. In a couple, individuals may be of a similar personality type, which may reflect positive assortative mating, or the personality of one member of the couple may dominate, which may be the case if one of the partners has the main responsibility for financial decisions.<sup>8</sup>

In order to mitigate against the potential problem of life cycle effects influencing personality traits and the subsequent measurement error this might induce, in both the couples and singles samples, we condition each personality trait  $T_j$  (i.e. one of the Big Five  $j=1,\dots,5$ ) on a polynomial in age  $\mathbf{A}$ , i.e.  $T_j = \theta_j \mathbf{A} + \varepsilon_j$ . The resulting residuals, i.e.  $Z_j = \hat{\varepsilon}_j = \hat{\theta}_j \mathbf{A}$ , are standardised (zero mean and unit standard deviation) and used as indicators of personality net of life cycle influences (see Nyhus and Pons, 2005, and Osborne Groves, 2005).

Defining  $i$  as the unit of observation in the two samples, i.e. either a couple or an individual, firstly, we explore the association between the Big Five personality traits and two aspects of finances, namely, the amount of unsecured debt ( $d_{it}$ ) and the total value of financial assets held by  $i$  over time  $t$  ( $a_{it}$ ).<sup>9</sup> In the couples sample, debt and assets are summed across the two individuals who constitute the couple, whilst in

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<sup>8</sup> The concept of assortative mating has been investigated in a number of contexts in economics, such as intergenerational mobility, see Ermisch et al. (2006).

<sup>9</sup> Financial investments include: national savings certificates, national savings, building society and insurance bonds; premium bonds; unit/investment trusts; personal equity plans; and shares.



the single individuals sample, debt and assets are that reported for the head of household.

### Methodology

In order to explore the determinants of assets and debt, we treat  $a_{it}$  and  $d_{it}$  as censored variables in our econometric analysis since they cannot have negative values. Following Bertaut and Starr-McCluer (2002), we employ a censored regression approach to ascertain the determinants of  $\ln(a_{it})$  and  $\ln(d_{it})$ , which allows for the truncation of the dependent variables.<sup>10</sup> We denote by  $\ln(a_{it}^*)$  and  $\ln(d_{it}^*)$  the corresponding untruncated latent variables, which theoretically can have negative values. We model  $\ln(a_{it})$  and  $\ln(d_{it})$  via a univariate tobit specification with Mundlak fixed effects for each dependent variable as follows:

$$\ln(d_{it}^*) = \beta_1' X_{it} + \alpha_1' \bar{X}_i + \sum_{j=1}^5 \gamma_j Z_{ji} + \varepsilon_{it_1} \quad (1)$$

$$\ln(d_{it}) = \ln(d_{it}^*) \quad \text{if } \ln(d_{it}^*) > 0 \quad (2)$$

$$\ln(d_{it}) = 0 \quad \text{otherwise} \quad (3)$$

$$\ln(a_{it}^*) = \beta_2' X_{it} + \alpha_2' \bar{X}_i + \sum_{j=1}^5 \pi_j Z_{ji} + \varepsilon_{it_2} \quad (4)$$

$$\ln(a_{it}) = \ln(a_{it}^*) \quad \text{if } \ln(a_{it}^*) > 0 \quad (5)$$

$$\ln(a_{it}) = 0 \quad \text{otherwise} \quad (6)$$

where the debts (assets) of couple or individual  $i$  at time  $t$  are given by  $d_{it}$  ( $a_{it}$ ) such that  $i=1, \dots, n$  and  $t=1, \dots, T$ ,  $X_{it}$  denotes a vector of characteristics (where throughout

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<sup>10</sup> In order to deal with the zero values of unsecured debt and financial assets, following the standard approach in the existing literature, we add one to each series.

we use the same covariates in both the debt and asset equations),  $Z_{ji}$  denotes each element of the Big Five residual ( $j=1,...,5$ ) which are constant over  $t$ , i.e. time invariant, and  $\varepsilon_{it_1}$  and  $\varepsilon_{it_2}$  are the stochastic disturbance terms. In order to allow for the panel nature of the data to control for unobserved time invariant effects, i.e. unobservable heterogeneity at the couple or individual level, a vector of additional covariates is incorporated into the modelling,  $\bar{\mathbf{X}}_i$ , which represents the means over time of those variables in  $\mathbf{X}_{it}$  that are time varying. Following Mundlak (1978), as stated in Brown et al. (2010), this enables the  $\beta$ 's,  $\gamma_j$ 's and  $\pi_j$ 's to be considered as an approximation to a standard panel fixed effects estimator with dummy variables for couples or individuals rather than these means.

Secondly, in order to explore the effects of personality traits on the types of unsecured debt and financial assets held, we estimate a series of probit models incorporating Mundlak fixed effects where the dependent variable indicates whether or not the couple or individual holds a particular type of debt or asset. Defining  $P_{it}^*$  as a continuous unobserved latent dependent variable, such as the utility gained from holding a particular type of debt or asset, and  $P_{it}$  as the observed empirical binary counterpart, our probit models are defined as follows:

$$\begin{aligned}
P_{it} &= 1 \quad \text{if} \quad P_{it}^* = \boldsymbol{\psi}' \mathbf{X}_{it} + \boldsymbol{\delta}' \bar{\mathbf{X}}_i + \sum_{j=1}^5 \lambda_j Z_{ji} + \varepsilon_{it} > 0 \\
P_{it} &= 0 \quad \text{otherwise}
\end{aligned} \tag{7}$$

For unsecured debt, we distinguish between five types of debt: hire purchase agreements; personal loans from banks, building societies or other financial institutions; credit cards; loans from private individuals; and other debt including catalogue or mail purchase agreements; student loans; and overdrafts. With respect to

financial assets, we distinguish between five types, namely: national savings certificates, national savings, building society and insurance bonds; premium bonds; unit/investment trusts; personal equity plans; and shares.<sup>11</sup>

We draw on the existing literature to specify  $\mathbf{X}_{it}$  which includes controls for the following head of household characteristics: gender; ethnicity; age, specifically aged 25-29, aged 30-34, aged 35-39, aged 40-44, aged 45-49 and aged 50-54 (55 to 59 is the reference category); highest educational qualification, i.e. degree, further education, A level, O level (GCSE), and all other qualifications (no education is the omitted category);<sup>12</sup> self-assessed health status, whether over the past 12 months the individual has been in excellent, good, or fair health (poor and very poor health is the reference category); labour force status, specifically whether employed or self-employed (all other labour market states constitute the reference category);<sup>13</sup> income quartile dummy variables for total household income relative to the sample mean (consisting of the sum of labour and non-labour income), specifically quartile 1 (0-24<sup>th</sup> percentile), quartile 2 (25-49<sup>th</sup> percentile) and quartile 3 (50-74<sup>th</sup> percentile) with the top quartile as the omitted category; housing tenure, specifically whether the home is owned outright, owned on a mortgage or rented from the council (all other types of tenure make up the omitted category); the number of children in the household; and, finally, to proxy family background and wealth, two binary indicators for whether the mother and/or father of the head of household were in paid employment when the individual was aged 14.

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<sup>11</sup> Unfortunately, information regarding the amount held in each debt and asset category is unavailable in the data set.

<sup>12</sup> GCSE level qualifications are taken after eleven years of formal compulsory schooling and approximate to the U.S. honours high school curriculum. The A level qualification is a public examination taken by 18 year olds over a two year period studying between one to four subjects and is the main determinant of eligibility for entry to higher education in the UK.

<sup>13</sup> The other labour force states in the reference category are: unemployed (3%); retired (2%); maternity leave (1%); family care (9%); long term sick or disabled (5%); government training scheme (0.1%); and unclassified (1%).

Summary statistics for the dependent variables, i.e. the natural logarithm of the amount of unsecured debt, the natural logarithm of the value of financial assets, and the types of debt and financial assets are shown in Table 1A. Throughout the empirical analysis, the values of all monetary variables have been deflated with 2005 as the base year. Table 1A reveals that a higher proportion of couples hold unsecured debt (financial assets) than single individuals: 59% (42%) and 48% (23%), respectively. In addition, on average, couples hold higher amounts of unsecured debt and financial assets than single individuals. To be specific, the average level of unsecured debt in the couples (single individuals) sample is 4.56 (3.39) natural logarithm units or £4,097 (£2,051) and the average level of financial assets in the couples (single individuals) sample is 3.00 (1.56) natural logarithm units or £5,748 (£2,890). For both the couples and singles samples, the most common type of unsecured debt accumulated is credit card debt and, in terms of financial assets, premium bonds and shares are the most prevalent.<sup>14</sup>

Figure 1 shows the distribution of each personality trait purged from life-cycle effects across each sample. For each personality trait, three distributions are shown: the mean of each personality trait across the couple; the personality trait of the head of household in the couple; and the head of household's personality trait for single individuals. In general, the figure reveals that the personality traits are less variable, in terms of having a smaller variance, in the sample of couples when the personality trait is measured at the mean of the couple. Regardless of the sample, personality traits based on the individual head of household would appear to have a larger variance. In

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<sup>14</sup> A potential concern with the empirical analysis may be selectivity issues in terms of non-response for information on debt and assets. For example, it may be that neurotic individuals are less likely to provide this information. For both samples, the proportion that refused to say if they have debts or assets and refused to give the amount was very small at less than 2%. This figure is very close to that in the raw data (i.e. covering all ages and household compositions) and, hence, we would argue that selectivity bias is not likely to be problematic in the subsequent empirical analysis.

Table 1B, we report the mean and standard deviation of each of the residual personality traits for both the couples and single individuals samples. The table is split into four panels showing statistics for the full sample, debtors (i.e. those holding positive amounts of unsecured debt), investors (i.e. those holding positive amounts of financial assets), and those holding debt and assets, respectively. Interestingly, when personality traits are measured as the mean of the couple, there is a switch in the sign of the mean for all traits with the exception of openness to experience, when comparing debtors to investors (Panels B and C). This suggests different associations across the two sides of the household balance sheet. Across each sample (i.e. couples or singles), all personality traits, with the exception of extraversion and neuroticism, have a larger mean in absolute terms for debtors and investors (see Panel D).

Summary statistics for the independent variables used in the analysis are given in Table 1C. In the couples sample, 91% of household heads are male, whilst interestingly in the single households, the majority are female at around 63%. Other noticeable differences between the samples are that: single individuals have a higher proportion in the youngest age category; they also have a slightly higher proportion in the lowest income quartile; renting is three times more common in the sample of single individuals, whilst owning a home on via a mortgage is more common for couples relative to single individuals at 72% and 44%, respectively. Hence, with respect to income and housing tenure, it would appear that single heads of household may be less wealthy.

### **3. Results**

An important caveat to acknowledge prior to discussing the findings of our empirical analysis is that the empirical findings which follow relate to correlations rather than causal relationships, that is we cannot rule out the possibility of reverse causality. The

sample statistics relating to the stability of the Big Five personality traits presented in Appendix A do provide tentative supportive evidence that personality traits are fixed in our sample and that the Big Five personality traits are exogenous covariates.<sup>15</sup> In addition, other researchers have argued that personality traits are fixed, such as Nyhus and Pons (2005) and Heineck and Anger (2010). If personality traits are, indeed, fixed then this implies that they are not driven by the outcome of interest, i.e. in the current context household finances (see, for example, Cobb-Clark and Schurer, 2013).

#### Analysis of the Amount of Debt and Assets Held

Table 2A presents the results from the univariate tobit Mundlak fixed effects analysis of the determinants of the amounts of debt and financial assets held, where average marginal effects (AMEs) on the expected value of the dependent variable (for both censored and uncensored observations) are reported. AMEs are calculated over all units of observations, i.e. couples or individuals in the case of the single sample. Results are presented for the residual of the personality measures obtained from conditioning the personality traits on a polynomial function in age to mitigate against life cycle effects and potential problems of measurement error (as discussed in Section 2).<sup>16</sup> Results are shown for both the couples and the single individuals sample, where in the case of the couples sample, two specifications are reported: firstly, for residual personality traits averaged across the couple; and secondly, the residual personality trait of the head of household in the couple.

It is apparent that, regardless of the sample analysed, unsecured debt is generally decreasing in age, which is consistent with the findings of Cox and Jappelli

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<sup>15</sup> The empirical methodology is based on fixed effects analysis throughout with a large set of control variables which will arguably help to mitigate the potential for simultaneity bias and reverse causality even if personality traits are not deemed fixed over time. However, we cannot rule out the possibility of reverse causality.

<sup>16</sup> The results, which follow, are consistent if we enter each personality trait separately, rather than simultaneously as reported.

(1993). For example, compared to those aged 55 and over, heads of household aged 25 to 29 have the highest levels of debt and the lowest levels of financial assets. More specifically, focusing on unsecured debt in the sample of couples (see Table 2A column 1), evaluating the expected value function of logged unsecured debt, when all covariates, including the dummy variables, are equal to 0 (in the reference categories), then:

$$E\left\{\ln(d_{it}) \mid \mathbf{X}_{it} = \bar{\mathbf{X}}_i = 0, Z_{jit} = 0\right\} = \Phi(\beta_0/\sigma)\beta_0 + \sigma\phi(\beta_0/\sigma)$$

which has the value 2.01, i.e.

$$E\left\{\ln(d_{it}) \mid \mathbf{X}_{it} = \bar{\mathbf{X}}_i = 0, Z_{jit} = 0\right\} = \left[\Phi(1.440/3.516) \times 1.440\right] + \left[3.516 \times \phi(1.440/3.516)\right]$$

where  $\phi$  and  $\Phi$  denote the density and cumulative distributions of the standard normal distribution, respectively,  $\beta_0$  is the intercept and  $\sigma$  is the standard error of the regression. Hence, log unsecured debt is 2.01 for those aged 55 and over as compared to  $2.01 + 1.14 = 3.15$  for those aged 25 to 29. Thus, couples with a head of household in the youngest age category hold over one and half times as much debt as those in the oldest category. Evaluated at the mean, this implies unsecured debt of £6,432 compared to £4,097.<sup>17</sup> Undertaking the same calculation for the single individuals sample, the youngest age group hold just under one and half times as much debt as those aged 55 and over. Evaluated at the mean this implies £2,996 of unsecured debt for individuals aged 25 to 29 compared to £2,051.

Turning briefly to the other control variables before focusing our discussion on personality characteristics, it is apparent that in each of the samples the level of

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<sup>17</sup> In the couples sample, given that log unsecured debt is 2.01 for those aged 55 and over compared to 3.15 for those aged 25 to 29, this latter group holds 1.57 times as much debt, i.e.  $(3.15/2.01) = 1.57$ . As detailed in Section 2 and Table 1A, the mean level of unsecured debt in the couples sample is 4.56 natural logarithm units or £4,097. Hence, taking this figure a rough back of envelope calculation suggests that those aged 25 to 29 have unsecured debt of  $\text{£}4,097 \times 1.57 = \text{£}6,432$ .

financial assets is positively associated with educational attainment (relative to having no qualifications) with the largest effects stemming from having a degree. Interestingly, those heads of household in poor health (the omitted category) have higher levels of financial assets in the sample of couples, whilst there is no significant association with the level of debt which is a common finding across each of the samples analysed. In terms of household income, generally the levels of both debt and financial assets are monotonically increasing across income quartiles. These findings generally tie in with the findings in the existing literature, see, for example, Brown and Taylor (2008), Crook (2001) and Gropp et al. (1997).

Turning to the Big Five personality traits, it is apparent that in the single individuals sample extraversion has the largest association (statistically significant and positive) with debt in terms of magnitude, as compared to the other four personality traits. For example, a one standard deviation increase in extraversion is associated with a 21.70 percentage point increase in unsecured debt. Conversely, in the couples sample, focusing on debt the largest correlation stems from agreeableness regardless of whether personality is measured as the mean across the couple or at the head of household level, where a one standard deviation increase in this element of the Big Five personality traits is associated with an increase in unsecured debt of over 22 percentage points. Across each sample, conscientiousness is inversely associated with the level of unsecured debt, whilst other personality traits, where statistically significant, are positively related to the level of unsecured debt. The finding that conscientiousness is negatively related to the amount of unsecured debt held ties in with the analysis of Donnelly et al. (2012), who report that individuals who are highly conscientious are more able to manage their money through greater levels of financial



self-control, and also with the results of Nyhus and Webley (2001) which suggest that conscientious individuals are less likely to have ever been in debt.

Turning to financial assets, in the couples sample, extraversion has a relatively large inverse association with financial asset holding suggesting that this personality trait has opposing associations with liabilities and assets. This is perhaps a surprising result given that extraversion encapsulates the concept of sociability and previous research, such as Christelis et al. (2010), has found that socially active individuals are more likely to own stocks and shares. For the single individuals sample, personality traits are not found to be associated with the level of financial assets. Our findings suggest that being assertive, ambitious and energetic – i.e. those characteristics associated with extraversion – are positively associated with the amount of unsecured debt held, yet negatively associated with the value of financial held by couples.

Interestingly, neuroticism is the only personality trait which consistently does not have a statistically significant association with unsecured debt and financial asset holding suggesting that this personality trait is not important in influencing this aspect of an individual's economic decision-making, *ceteris paribus*. The lack of a statistically significant association between neuroticism and unsecured debt is perhaps surprising given that Nyhus and Webley (2001) found that emotional instability (i.e. neuroticism) is a positive predictor of debt. Moreover, given that neuroticism is related to pessimism, the finding that it has a statistically insignificant association with household finances is interesting in the context of the positive association found in the existing literature relating to financial optimism and debt.

In the sample of couples, we have also investigated whether it is the personality of the head of household (typically the male, see Table 1C) or the personality of their spouse which is associated with the amounts of debt and financial

assets held. For the amount of unsecured debt held, for example, all of the personality traits of the head of household are statistically significant with the exception of neuroticism, whilst the only significant associations from the spouse stem from extraversion and neuroticism. A caveat with such analysis incorporating the personality traits of both the head of household and their spouse simultaneously in the specification is the potential problem of co-linearity. Indeed, each of the personality traits is significantly correlated with each other in the couple.<sup>18</sup>

The magnitudes of the associations of personality traits with household finances are relatively small compared to that of household income. For example, in both of the specifications for the couples sample, having income in the lowest quartile is associated with having approximately 50 percentage points less unsecured debt than those households in the top income quartile, a correlation which is around two times larger than that found from agreeableness (the personality trait which has the largest coefficient in terms of absolute magnitude).<sup>19</sup> Our findings thus indicate that certain personality traits are associated with household finances, yet the importance of economic and financial factors remain once these variables, which are typically unobserved in large scale representative surveys, are taken into account.<sup>20</sup>

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<sup>18</sup> The full results of this analysis are available on request.

<sup>19</sup> This calculated by considering the ratio of the AMEs, i.e. from Table 2A  $(0.50/0.24)=2.08$ .

<sup>20</sup> An alternative estimation strategy to the Tobit model is to adopt a Heckman sample selection model given the censoring of both unsecured debt and financial assets. To explore the robustness of our results, we follow Bertaut and Starr-McCluer (2002) and estimate a Heckman selection model. This has the potential advantage in that it allows for correlation between the decision to hold unsecured debt (financial assets) and the amount of unsecured debt (financial assets) held conditional on this being a positive amount. We adopt the same instruments for the decision to hold debt (assets) as Bertaut and Starr-McCluer (2002), namely the proportion of household heads employed in the financial services in the region and the proportion of household heads employed in a workplace of 500 or more in the region. The results for the couples sample reveal that extraversion is the only personality trait correlated with the level of unsecured debt. Conversely, all personality traits with the exception of openness to experience have a statistically significant association with the probability of holding debt with the only inverse relationship stemming from conscientiousness consistent with our previous analysis. For the sample of single individuals, only conscientiousness is correlated with the amount of unsecured debt, having a positive correlation, whilst it is inversely related to the probability of holding debt. The instruments used are jointly statistically significant. For financial assets, the only significant

Alternative AMEs can also be calculated. For example, Wooldridge (2010) suggests reporting either the AME based on censored and uncensored observations, which we provide in Table 2A, or AMEs based on the expected value of the dependent variable  $y$  for uncensored observations given a vector of covariates  $\mathbf{X}$  and parameters  $\boldsymbol{\beta}$ , i.e. for a unit change in  $x_k$  defined as follows:

$$\frac{\partial E[y | y > 0, x_k]}{\partial x_k} = \beta_k \left\{ 1 - \lambda(\alpha) \left[ \frac{\mathbf{X}'\boldsymbol{\beta}}{\sigma} \right] + \lambda(\alpha) \right\} \quad (8)$$

where  $\lambda(\alpha) = \phi\left(\frac{\mathbf{X}'\boldsymbol{\beta}}{\sigma}\right) / \Phi\left(\frac{\mathbf{X}'\boldsymbol{\beta}}{\sigma}\right)$ . In order to explore the robustness of our findings, and consider whether personality traits are associated with household finances conditional on selection, i.e. holding liabilities or assets so  $y > 0$ , in Table 2B, we provide the AMEs based on equation (8). For brevity, we only show the AMEs for the personality traits. Generally, where statistically significant, the AMEs based on the uncensored part of the distribution of the dependent variable correspond to those reported in Table 2A in terms of direction of correlation – however, the magnitude tends to be lower. For example, in the couples sample, a one standard deviation increase in openness to experience in the couple based on the AME calculated on the expected value for the dependent variable for both censored and uncensored observations (uncensored observations only), is associated with an increase in the value of unsecured debt by 19.1 (15.7) percentage points.<sup>21</sup>

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association is between extraversion and the probability of having assets, which is an inverse association. Full results are available on request.

<sup>21</sup> To investigate whether the relationship between personality traits and household finances varies across the income distribution we interacted each of the personality traits with the income quartile dummy variables. Joint tests on the interaction terms revealed that in general there was no differential impact from personality traits on finances across the income distribution, the only exceptions being in the case of extraversion and neuroticism. We have also explored whether there are heterogeneous correlations of personality traits with unsecured debt and financial assets by exploring interactions with gender, education and age. Considering gender, there is consistent evidence that the association between extraversion and the level of financial assets is exacerbated for males (this is evident for couples). All other gender interactions with each personality trait are statistically insignificant. Considering education, there is some evidence in the couples sample that agreeableness has a

Given that there are three waves of data on unsecured debt and financial assets, we have re-estimated equations (1) and (4) including a lagged dependent variable. For brevity, we only comment here on the findings for debt held in couples. The results reveal that, in the couples sample, all personality traits with the exception of conscientiousness have a statistically significant association with debt. In the couples sample, when the head of household's personality traits are included only extraversion and agreeableness remain statistically significant. These results should be treated with caution, however, as we have not specified initial conditions, since specifying the initial condition would lead to losing a wave. Ideally, panel data over more than just three waves is required for such analysis.<sup>22</sup>

#### Analysis of the Types of Debt and Assets Held

In Table 3, we present the results of the probit analysis incorporating Mundlak fixed effects of the type of debt held, where the results for the mean personality trait in the couple are given in Panel A; the results for the head of household's personality traits for the couples sample are given in Panel B; and in Panel C the results for the single individuals sample are reported. The probit analysis of the probability of holding debt across the different samples, irrespective of type of debt held, reveals that conscientiousness, that is being hard-working and achievement oriented, is inversely associated with holding unsecured debt which is consistent with the tobit analysis and the findings of Donnelly et al. (2012), whilst the other four personality traits are positively associated with debt holding where statistically significant.

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differential association with the level of unsecured debt, in that the null hypothesis that each interaction term is simultaneously equal to zero is rejected and this is driven by the interaction between having a degree and agreeableness where the association is positive. Conversely, turning to the level of financial assets, the joint test that the effect of openness to experience is equal to zero across education levels is rejected and this is driven by the interaction between having a degree and openness to experience where the association is negative. Interestingly, the joint test that the correlation of each personality trait across different age groups is equal to zero cannot be rejected. Full results are available on request.

<sup>22</sup> These findings are available on request.

We also investigate the probability of holding debt above the median in each sample, which arguably helps to identify those individuals (or couples) who are more likely to hold debt in the long run (i.e. those with high amounts) than those who hold only small amounts, which may be much less persistent. Comparing the second column in Table 3 to the first column, it is evident that, across the samples, some of the personality traits are driven to statistical insignificance and, for those that remain statistically significant, the magnitude of the association with holding unsecured debt is now smaller. This might be indicative of personality traits having a weaker association with long term debt accumulation.

It is apparent that the role of the personality traits differs by type of debt held. For example, neuroticism is the only personality trait associated with the probability of holding hire purchase agreements, typically used to spread the cost of purchasing goods such as cars and consumer durables over a specified time period, having a positive association in the couples sample. Specifically, a one standard deviation increase in neuroticism is associated with a 1.8 percentage point higher probability of holding hire purchase debt. In both the samples of couples and single individuals, the personality trait which has the largest correlation with the probability of having credit card debt is openness to experience. For example, a one standard deviation increase in openness to experience is associated with a 4.1 percentage point higher probability of having credit card debt in the couples sample (Panel A). Conversely, conscientiousness has an inverse association with the probability of having this type of debt. Given the prevalent use of credit cards arguably compulsive buying would be strongly associated with this type of readily available and prevalent type of debt. Consequently our findings are consistent with previous research which has found evidence that individuals who manage their money more effectively and are

conscientious are less likely to undertake compulsive buying, see, for example, Pham et al. (2012) and Mowen and Spears (1999).

The probability of holding other types of debt, which includes overdrafts, arguably a relatively straightforward channel of credit to arrange, is positively associated with extraversion and neuroticism in the sample of single individuals. For example, for single individuals a one standard deviation increase in extraversion is associated with an increase in the probability of holding other types of unsecured debt of 2.44 percentage points. Conscientiousness, in contrast, has an inverse association with the probability of holding other types of debt, which re-enforces the notion that being hard-working and target-focused is associated with a lower probability of holding unsecured debt.

In Table 4, the results from the probit analysis of the probability of holding different types of financial assets are presented. The table is constructed in the same way as Table 3 having three panels each corresponding to a different sample, i.e. Panels A and B relate to couples and Panel C relates to single individuals. In the couples sample, extraversion is found to have an inverse association, whilst the mean of openness to experience in the couple is found to be positively associated with the probability of holding financial assets regardless of type. It would appear that personality traits are not associated with the probability of holding financial assets above the median. If holding financial assets above the median is related to accumulating (i.e. relatively high amounts) financial assets in the long run, the lack of a significant association with personality traits might imply that there is no differential correlation with the Big Five personality traits on this side of the household balance sheet between the short run and long run.

In contrast to the association of personality traits with the different types of unsecured debt held, there is generally little evidence that personality traits are correlated with the probability of holding different types of financial assets. The notable exception is for the association between certain personality traits and the probability of holding stocks and shares. Stocks and shares are arguably the riskiest form of financial assets in terms of rate of return, and the probability of holding this type of financial asset is inversely associated with extraversion and positively correlated with openness to experience in the couples sample (Panel A). Specifically, a one standard deviation increase in extraversion (openness to experience) is associated with a decrease (an increase) in the probability of holding shares by 1.87 (2.37) percentage points. The negative association that extraversion has with the probability of owning stocks and shares is perhaps surprising and goes against a priori expectations given that an element of this personality trait relates to sociability. For example, U.S. evidence has reported a positive association between measures of social interaction and stock market participation, such as Hong et al. (2004). Extraversion also encapsulates being talkative which may help the diffusion of information where Ivković and Weisbenner (2007) have found a positive relationship between a household's stock purchases and those made by neighbours operating via a word-of-mouth effect. Interestingly, openness to experience has been found in the existing literature to be associated with self-employment, which is typically regarded as being characterised by risk tolerant individuals (see, for example, Parker, 2009). Hence, our findings regarding the relationship between openness to experience and the holding of stocks and shares tie in with this type of behaviour.<sup>23</sup>

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<sup>23</sup> It is possible that decisions about asset holding are taken in conjunction with decisions about borrowing, see for example, Paxson (1990). Bertaut and Starr-McCluer (2002) investigate this by estimating a multivariate probit model for different types of assets and debt held. We also adopted a similar strategy by jointly estimating the probability of holding each of the five types of unsecured debt

#### 4. Conclusion

The recent financial crisis has highlighted the importance of furthering our understanding of what influences the financial decisions made by individuals and households. The influence of psychological factors on economic outcomes is attracting increasing interest amongst both academics and policymakers. The role of individual risk attitudes has been a particular focus in recent years amongst both academics and policy makers. For example, existing research has found that openness to experience, neuroticism and agreeableness are all related to risk aversion, see, for example, Dohmen et al. (2011) and Borghans et al. (2009). With respect to financial decision-making, Weber et al. (2013) analyse the decisions of a sample drawn from Barclay's stockbrokers' client base focusing on the relationship between risk taking, expectations and risk attitudes. Indeed, they note the practical implications of their analysis in the context of financial market regulation such as the Markets in Financial Instruments Directive 'MiFID' of the European Parliament and European Council (2006), which requires financial advisors to take into account 'the customer's preferences regarding risk taking, their risk profile and the purpose of the investment.' Such directives have led to the use of risk attitudes profiling in the context of this particular aspect of household finances further highlighting of the importance of such attitudes for financial decision-making.

In this paper, we have analysed household finances from a broader perspective encompassing debt and financial asset holding at the household level using a large nationally representative data set. In addition, we have focused on the relationship between household finances and personality traits rather than preferences and attitudes (although these are undoubtedly related concepts, see, for example, Almlund

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and the five types of financial assets simultaneously. There is some evidence that couples hold a mixed portfolio of unsecured debt and financial assets since the null hypothesis that the disturbance terms are uncorrelated is rejected. Full results are available on request.



et al., 2011). Our findings suggest that some personality traits are statistically significantly associated with the amount of unsecured debt and financial assets held by households. Whilst differences exist across couples and single individuals, this is perhaps not surprising given that in the couples sample around 91% of heads of household are male compared to 37% in the singles sample. Our analysis suggests that personality traits have different associations with the various types of debt. For example, extraversion is positively associated with the probability of holding credit card debt whilst conscientiousness is inversely associated with the probability of holding this type of debt. Given the association that these two personality traits have with risk attitudes, it may be the case that profiling as in the case of the 'MiFID' may help predict which households are likely to accumulate this type of debt, which is the most prevalent type in our samples.

Conversely, our findings suggest that no relationship exists between the different types of financial assets held and personality traits. The only exception is the relationship between personality traits and the probability of holding shares, where extraversion (openness to experience) is inversely (positively) related to the likelihood of holding this type of asset in the couples sample. In the sample of single individuals, agreeableness is inversely associated with the likelihood of holding shares.

Overall, our empirical analysis indicates that certain personality traits are associated with a number of aspects of individuals' economic and financial decision-making. In addition, our findings confirm that the role of economic and financial factors such as income remains once we control for factors such as personality which are typically not unobserved in large scale representative surveys. Our paper thus contributes to the growing empirical literature on individual and household finances furthering our understanding of the determinants of debt and asset holding, as well as,

contributing more generally to the expanding literature exploring the implications of personality traits for economic outcomes.

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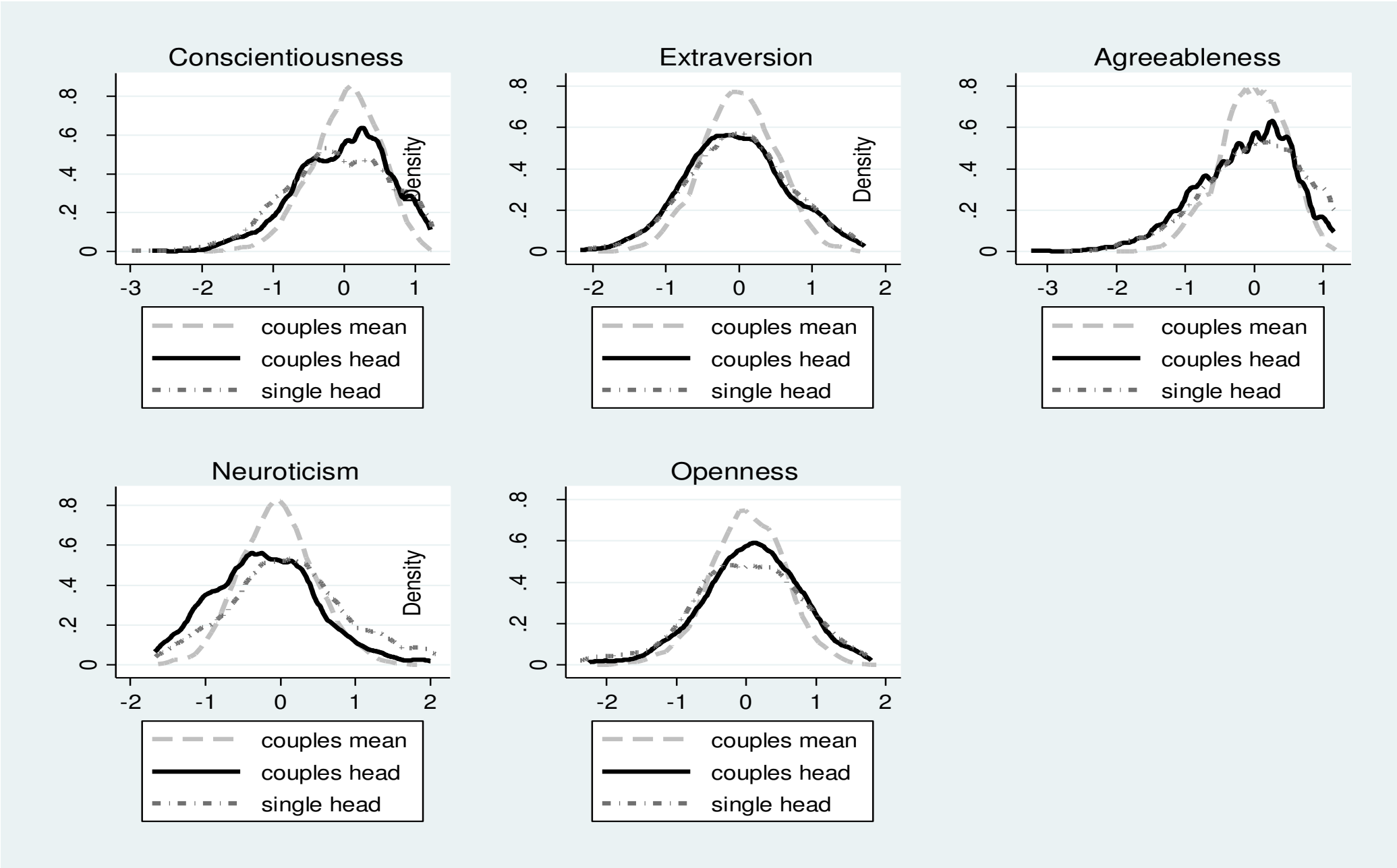
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**FIGURE 1:** Distribution of Personality Traits – Residual BIG5 across Samples



Data is an unbalanced panel from the British Household Panel Survey in 1995, 2000 and 2005. The sample of couples constitutes the head of household and their spouse, whilst the sample of single individuals relates to a household comprising a single adult who is the head of household. For the couples sample personality traits are shown based on the mean of a particular trait in the couple and also measured by that of the head of household. Each of the personality traits has been conditioned on a polynomial in age to net out life cycle influences. The resulting personality trait is based on the standardised residual from this process, i.e. zero mean and unit standard deviation.

**TABLE 1A:** Summary Statistics – Dependent Variables

	COUPLES SAMPLE		SINGLES SAMPLE	
	Mean	Std.	Mean	Std.
$\ln(d_{it})$	4.5605	4.0511	3.3856	3.6916
$\ln(a_{it})$	3.0008	3.9958	1.5599	3.1884
Holding debt	0.5853	0.4927	0.4847	0.4999
Holding debt above median £	0.2925	0.4550	0.2422	0.4285
Hire Purchase Agreement	0.2211	0.4150	0.1070	0.3092
Personal loan	0.3195	0.4663	0.2034	0.4026
Credit card debt	0.3006	0.4586	0.2055	0.4041
Loan from private individual	0.0189	0.1363	0.0189	0.1361
Other debt	0.2130	0.4095	0.2024	0.4019
Holding assets	0.4151	0.4928	0.2268	0.4188
Holding assets above median £	0.2076	0.4056	0.1129	0.3165
National savings	0.0367	0.1880	0.0223	0.1477
Premium bonds	0.3008	0.4587	0.1533	0.3604
Unit trusts	0.1022	0.3030	0.0511	0.2203
Personal equity plans	0.1844	0.3878	0.0930	0.2904
Shares	0.2878	0.4528	0.1472	0.3543
OBSERVATIONS	4,225		2,915	

Data is an unbalanced panel from the British Household Panel Survey in 1995, 2000 and 2005. The sample of couples constitutes the head of household and their spouse, whilst the sample of single individuals relates to a household comprising a single adult who is the head of household. Summary statistics for all dependent variables are shown based on the two different samples.



**TABLE 1B:** Summary Statistics – Residual Personality Traits

	COUPLES SAMPLE				SINGLES SAMPLE	
	COUPLE MEAN <sup>1</sup>		HEAD <sup>2</sup>		Mean	Std.
	Mean	Std.	Mean	Std.		
<b>PANEL A: Full sample</b>						
Conscientiousness	0	1	0	1	0	1
Extraversion	0	1	0	1	0	1
Agreeableness	0	1	0	1	0	1
Neuroticism	0	1	0	1	0	1
Openness to experience	0	1	0	1	0	1
OBSERVATIONS	4,225				2,915	
<b>PANEL B: Debtors, i.e. <math>\ln(d_{it}) &gt; 0</math></b>						
Conscientiousness	-0.0101	0.9972	-0.0171	0.9977	-0.0279	0.9851
Extraversion	0.0598	0.9966	0.0453	0.9960	0.0619	1.0053
Agreeableness	0.0456	0.9783	0.0385	0.9849	0.0276	0.9807
Neuroticism	0.0208	1.0120	0.0191	1.0035	0.0295	1.0040
Openness to experience	0.0293	0.9829	0.0142	0.9896	0.0601	0.9545
OBSERVATIONS	2,473				1,413	
<b>PANEL C: Investors, i.e. <math>\ln(a_{it}) &gt; 0</math></b>						
Conscientiousness	0.0196	0.9257	0.0261	0.9329	-0.0292	0.9548
Extraversion	-0.0240	1.0118	-0.0447	1.0129	0.0090	0.9802
Agreeableness	-0.0023	0.9610	0.0071	0.9465	-0.1062	0.9954
Neuroticism	-0.0042	0.9647	-0.0079	0.9808	-0.1183	0.9442
Openness to experience	0.0122	0.9370	0.0979	0.9352	0.1419	0.9321
OBSERVATIONS	1,754				661	
<b>PANEL D: Debtors and Investors</b>						
Conscientiousness	0.0460	0.9132	0.0284	0.9249	-0.0593	0.9507
Extraversion	0.0294	0.9898	-0.0144	0.9860	0.0456	0.9679
Agreeableness	0.0706	0.9289	0.0528	0.9321	-0.0830	0.9589
Neuroticism	0.0087	0.9795	0.0157	0.9882	-0.0761	0.9117
Openness to experience	0.1531	0.9195	0.1016	0.9177	0.2254	0.8888
OBSERVATIONS	1,042				322	

Data is an unbalanced panel from the British Household Panel Survey in 1995, 2000 and 2005. The sample of couples constitutes the head of household and their spouse, whilst the sample of single individuals relates to a household comprising a single adult who is the head of household. Summary statistics for all personality traits are shown based on the two different samples. Each of the personality traits has been conditioned on a polynomial in age to net out life cycle influences. The resulting personality trait is based on the standardised residual from this process, i.e. zero mean and unit standard deviation. Notes: <sup>1</sup> refers to mean of the personality trait in the couple; <sup>2</sup> refers to the personality trait of the head of household in the couple.

**TABLE 1C:** Summary Statistics – Explanatory Variables

	COUPLES SAMPLE		SINGLES SAMPLE	
	Mean	Std.	Mean	Std.
Male	0.9108	0.2851	0.3671	0.4821
White	0.9628	0.1892	0.9595	0.1972
Age 25 to 29	0.0762	0.2654	0.1273	0.3333
Age 30 to 34	0.1441	0.3513	0.1465	0.3537
Age 35 to 39	0.1422	0.3493	0.1304	0.3368
Age 40 to 44	0.1806	0.3847	0.1698	0.3755
Age 45 to 49	0.1285	0.3347	0.1238	0.3295
Age 50 to 54	0.1425	0.3496	0.1304	0.3368
Education: Degree	0.1827	0.3865	0.1708	0.3764
Education: Further	0.3314	0.4708	0.2943	0.4558
Education: A level	0.1252	0.3310	0.1026	0.3045
Education: O level	0.1586	0.3653	0.1739	0.3791
Education: other	0.0649	0.2463	0.0751	0.2636
Health excellent	0.2757	0.4469	0.2196	0.4140
Health good	0.4951	0.5000	0.4377	0.4962
Health fine	0.1718	0.3773	0.2134	0.4098
Employed	0.7339	0.4419	0.6343	0.4817
Self-employed	0.1512	0.3583	0.0813	0.2733
Household total income: quartile 1	0.2502	0.4332	0.2768	0.4475
Household total income: quartile 2	0.2497	0.4329	0.2611	0.4393
Household total income: quartile 3	0.2502	0.4332	0.2491	0.4325
Own home: no mortgage	0.1384	0.3454	0.1485	0.3557
Own home: with mortgage	0.7195	0.4493	0.4381	0.4962
Rent home from council	0.0883	0.2837	0.2621	0.4398
Number of Children	1.0530	1.1235	0.5177	0.9041
Whether mother worked when aged 14	0.5714	0.4949	0.5832	0.4931
Whether father worked when aged 14	0.9392	0.2390	0.9146	0.2796
OBSERVATIONS	4,225		2,915	

Data is an unbalanced panel from the British Household Panel Survey in 1995, 2000 and 2005. The sample of couples constitutes the head of household and their spouse, whilst the sample of single individuals relates to a household comprising a single adult who is the head of household. Summary statistics for all control variables (excluding personality traits) are shown based upon the two different samples.

**TABLE 2A: Tobit Analysis with Mundlak Fixed Effects: The Determinants of Debt and Financial Assets**

	COLUMN 1: SAMPLE=COUPLES MEAN BIG5 WITHIN COUPLE				COLUMN 2: SAMPLE=COUPLES MEAN BIG5 OF HEAD				COLUMN 3: SAMPLE=SINGLES MEAN BIG5 OF HEAD			
	DEBT		ASSETS		DEBT		ASSETS		DEBT		ASSETS	
	M.E.	t-stat	M.E.	t-stat	M.E.	t-stat	M.E.	t-stat	M.E.	t-stat	M.E.	t-stat
Intercept	1.4402	(2.21)	-2.6363	(2.58)	1.4608	(2.21)	-1.6623	(2.59)	0.8677	(1.76)	-1.1183	(2.58)
Conscientiousness	-0.2323	(3.09)	-0.0537	(0.72)	-0.2012	(2.71)	-0.0066	(0.09)	-0.1963	(2.40)	-0.1087	(1.58)
Extraversion	0.2242	(3.07)	-0.1485	(2.11)	0.2004	(2.77)	-0.1362	(1.97)	0.2172	(2.39)	-0.0360	(0.56)
Agreeableness	0.2418	(3.34)	0.0724	(1.03)	0.2218	(3.11)	0.0871	(1.26)	0.1036	(1.31)	-0.0553	(0.85)
Neuroticism	0.1472	(1.58)	0.0241	(0.35)	0.0796	(1.09)	0.1015	(1.44)	0.0828	(1.05)	-0.0503	(0.76)
Openness to experience	0.1908	(2.56)	0.1903	(2.63)	0.0932	(1.26)	0.1206	(1.88)	0.1861	(2.63)	0.0935	(1.37)
Male	-0.2559	(1.10)	0.1168	(0.49)	-0.1656	(0.70)	0.1282	(0.53)	-0.0703	(0.42)	0.2738	(2.11)
White	0.7769	(3.77)	-0.2231	(0.62)	0.7739	(3.75)	-0.2500	(0.77)	0.0376	(0.10)	-0.2987	(1.07)
Age 25 to 29	1.1418	(4.28)	-0.8044	(3.94)	1.0703	(4.01)	-0.8114	(4.01)	0.9276	(5.49)	-0.3016	(3.37)
Age 30 to 34	0.8345	(3.84)	-0.6370	(3.89)	0.7994	(3.67)	-0.6555	(3.93)	0.7457	(4.99)	-0.2718	(1.42)
Age 35 to 39	0.4503	(2.03)	-0.3822	(1.87)	0.4180	(1.89)	-0.3855	(1.89)	0.8182	(3.23)	-0.2716	(1.51)
Age 40 to 44	0.1438	(0.72)	-0.1483	(0.83)	0.1154	(0.58)	-0.1528	(0.85)	0.5284	(2.31)	-0.0193	(0.12)
Age 45 to 49	-0.2338	(1.10)	-0.0360	(0.19)	-0.2568	(1.21)	-0.0313	(0.17)	0.3829	(1.57)	0.0077	(0.04)
Age 50 to 54	-0.3868	(1.94)	-0.1403	(0.83)	-0.4117	(2.06)	-0.1381	(0.82)	0.1210	(0.52)	0.1146	(0.73)
Education: Degree	-0.4978	(0.57)	0.8500	(3.32)	-0.4297	(0.49)	0.8879	(3.37)	0.4665	(0.67)	0.4558	(1.87)
Education: Further	0.5671	(2.61)	0.8115	(5.48)	0.6182	(2.84)	0.4293	(5.64)	0.2982	(1.26)	0.2655	(2.43)
Education: A level	-0.3095	(0.62)	0.6819	(3.22)	-0.2633	(0.52)	0.7219	(3.31)	-0.0522	(0.09)	0.3924	(1.65)
Education: O level	0.9762	(3.15)	0.8362	(4.36)	1.0187	(3.24)	0.4594	(4.44)	0.4099	(0.79)	0.2574	(1.52)
Education: other	0.7341	(1.67)	0.6977	(2.56)	0.7716	(1.72)	0.7272	(2.61)	0.9059	(1.82)	0.3566	(1.39)
Health excellent	-0.3708	(0.83)	-0.8065	(2.76)	-0.3325	(0.74)	-0.8114	(2.77)	-0.2635	(0.64)	0.0328	(0.11)
Health good	-0.4984	(1.20)	-0.5385	(3.25)	-0.4675	(1.12)	-0.5412	(3.25)	-0.0797	(1.61)	0.1497	(0.55)
Health fine	-0.4180	(0.99)	-0.7682	(2.77)	-0.3954	(0.94)	-0.7618	(2.75)	-0.0205	(0.06)	0.1824	(0.67)
Employed	0.8800	(3.53)	0.1915	(0.62)	0.8877	(3.58)	0.1968	(0.64)	0.4037	(1.39)	-0.1624	(0.69)
Self-employed	0.6252	(2.01)	0.1165	(0.30)	0.6422	(2.03)	0.1179	(0.30)	0.6435	(1.31)	-0.3180	(0.88)
Household total income: quartile 1	-0.5023	(2.63)	-0.8097	(4.57)	-0.4759	(2.49)	-0.3964	(4.58)	-0.7647	(3.56)	-0.4457	(3.93)
Household total income: quartile 2	-0.2372	(1.38)	-0.6467	(4.16)	-0.2370	(1.38)	-0.2360	(4.19)	-0.4815	(2.42)	-0.3209	(2.16)
Household total income: quartile 3	-0.3037	(1.85)	-0.4079	(2.85)	-0.3006	(1.83)	-0.4102	(2.87)	-0.3042	(1.62)	-0.2402	(1.82)
Own home: no mortgage	-0.9608	(1.79)	-0.0805	(0.17)	-0.9593	(1.79)	-0.0823	(0.18)	-0.8968	(1.84)	0.2095	(0.63)
Own home: with mortgage	0.1673	(0.37)	-0.3449	(0.83)	0.1976	(0.44)	-0.3493	(0.84)	-0.1800	(0.50)	0.3278	(1.19)
Rent home from council	-0.7269	(2.06)	-0.2059	(0.91)	-0.7285	(2.06)	-0.6294	(0.92)	0.1049	(0.24)	0.1012	(0.25)
Number of Children	0.0945	(0.93)	0.1419	1.55)	0.0892	(0.88)	0.1400	(1.53)	0.1468	(1.67)	-0.1088	(3.85)
Whether mother worked when aged 14	0.3444	(2.52)	-0.0298	(0.23)	0.3391	(2.48)	-0.0346	(0.26)	0.1411	(0.96)	0.1929	(1.60)
Whether father worked when aged 14	0.0698	(0.26)	0.7226	(2.60)	0.0823	(0.30)	0.7169	(2.58)	-0.1548	(0.61)	0.2376	(2.61)
ρ; p value	0.335; p=[0.000]		0.452; p=[0.000]		0.339; p=[0.000]		0.451; p=[0.000]		0.329; p=[0.000]		0.503; p=[0.000]	
σ; p value	3.516; p=[0.000]		5.493; p=[0.000]		3.549; p=[0.000]		5.495; p=[0.000]		3.690; p=[0.000]		6.203; p=[0.000]	
Wald statistic $\chi^2$ (d); p value	405.07; p=[0.000]		463.72; p=[0.000]		390.68; p=[0.000]		463.49; p=[0.000]		242.17; p=[0.000]		289.45; p=[0.000]	
OBSERVATIONS	4,225				4,225				2,915			

Data is an unbalanced panel from the British Household Panel Survey in 1995, 2000 and 2005. The sample of couples constitutes the head of household and their spouse, whilst the sample of single individuals relates to a household comprising a single adult who is the head of household. Each of the personality traits has been conditioned on a polynomial in age to net out life cycle influences. The resulting personality trait is based on the standardised residual from this process, i.e. zero mean and unit standard deviation. In the first column the personality trait is based on the mean in the couple, whilst in the second and final column the personality trait relates to that of the head of household. The dependent variables in columns 1 and 2 are debt and assets held by the couple, whilst in the final column the dependent variables are debt and assets held by the head of household. Estimates are based on a random effects tobit incorporating Mundlak fixed effects. d=46 in the couples sample and 44 in the singles sample. Average Marginal Effects are reported based upon the expected value of the dependent variable for both censored and uncensored observations. T-statistics are reported in parenthesis.

**TABLE 2B:** Tobit Analysis with Mundlak Fixed Effects: The Determinants of Debt and Financial Assets

	COLUMN 1: SAMPLE=COUPLES MEAN BIG5 WITHIN COUPLE				COLUMN 2: SAMPLE=COUPLES MEAN BIG5 OF HEAD				COLUMN 3: SAMPLE=SINGLES MEAN BIG5 OF HEAD			
	DEBT		ASSETS		DEBT		ASSETS		DEBT		ASSETS	
	M.E.	t-stat	M.E.	t-stat	M.E.	t-stat	M.E.	t-stat	M.E.	t-stat	M.E.	t-stat
Intercept	1.4402	(2.21)	-2.6363	(2.58)	1.4608	(2.21)	-1.6623	(2.59)	0.8677	(1.76)	-1.1183	(2.58)
<b>Conscientiousness</b>	-0.1911	(3.09)	-0.0438	(0.72)	-0.1654	(2.71)	-0.0054	(0.09)	-0.1592	(2.40)	-0.1108	(1.58)
<b>Extraversion</b>	0.1844	(3.07)	-0.1211	(2.11)	0.1647	(2.77)	-0.1111	(1.97)	0.1510	(2.39)	-0.0367	(0.56)
<b>Agreeableness</b>	0.1990	(3.34)	0.0590	(1.03)	0.1823	(3.11)	0.0710	(1.26)	0.0840	(1.31)	-0.0564	(0.85)
<b>Neuroticism</b>	0.1212	(2.08)	0.0196	(0.35)	0.0655	(1.09)	0.0828	(1.44)	0.0672	(1.05)	-0.0512	(0.76)
<b>Openness to experience</b>	0.1570	(2.56)	0.1552	(2.63)	0.0767	(1.26)	0.0984	(1.68)	0.1762	(2.63)	0.0953	(1.37)
Controls	As in Table 2A											
ρ; p value	0.335; p=[0.000]		0.452; p=[0.000]		0.339; p=[0.000]		0.451; p=[0.000]		0.329; p=[0.000]		0.503; p=[0.000]	
σ; p value	3.516; p=[0.000]		5.493; p=[0.000]		3.549; p=[0.000]		5.495 p=[0.000]		3.690; p=[0.000]		6.203; p=[0.000]	
Wald statistic χ <sup>2</sup> (d); p value	405.07; p=[0.000]		463.72; p=[0.000]		390.68; p=[0.000]		463.49; p=[0.000]		242.17; p=[0.000]		289.45; p=[0.000]	
OBSERVATIONS	4,225				4,225				2,915			

Data is an unbalanced panel from the British Household Panel Survey in 1995, 2000 and 2005. The sample of couples constitutes the head of household and their spouse, whilst the sample of single individuals relates to a household comprising a single adult who is the head of household. Each of the personality traits has been conditioned on a polynomial in age to net out life cycle influences. The resulting personality trait is based on the standardised residual from this process, i.e. zero mean and unit standard deviation. In the first column the personality trait is based on the mean in the couple, whilst in the second and final column the personality trait relates to that of the head of household. The dependent variables in columns 1 and 2 are debt and assets held by the couple, whilst in the final column the dependent variables are debt and assets held by the head of household. Estimates are based on a random effects tobit incorporating Mundlak fixed effects. d=46 in the couples sample and 44 in the singles sample. The control variables (not reported here for brevity) are as in Table 2A. Average Marginal Effects are reported based upon the expected value of the dependent variable for uncensored observations. T-statistics are reported in parenthesis.

**TABLE 3:** Probit Analysis with Mundlak Fixed Effects: Type of Unsecured Debt

PANEL A SAMPLE=COUPLES MEAN BIG5 WITHIN COUPLE	HOLDING DEBT		HOLDING DEBT ABOVE £MEDIAN		HIRE PURCHASE		PERSONAL LOAN		CREDIT CARD		PRIVATE INDIVIDUAL		OTHER DEBT	
	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat
Conscientiousness	-0.0327	(2.93)	-0.0247	(2.57)	-0.0056	(0.71)	-0.0214	(2.07)	-0.0360	(3.44)	-0.0032	(0.54)	-0.0092	(1.22)
Extraversion	0.0349	(3.22)	0.0060	(0.66)	0.0100	(1.30)	0.0204	(2.05)	0.0216	(2.14)	-0.0037	(0.20)	0.0127	(1.72)
Agreeableness	0.0345	(3.22)	0.0228	(2.48)	0.0051	(0.67)	0.0252	(2.54)	0.0149	(1.48)	0.0066	(2.26)	0.0094	(1.29)
Neuroticism	0.0220	(2.08)	0.0088	(0.97)	0.0180	(2.40)	0.0069	(0.71)	0.0091	(0.92)	0.0043	(1.87)	0.0063	(0.88)
Openness to experience	0.0259	(2.35)	0.0182	(1.92)	0.0115	(1.47)	0.0128	(1.25)	0.0411	(3.97)	0.0064	(2.30)	0.0073	(0.97)
ρ; p value	0.417; p=[0.000]		0.351; p=[0.000]		0.206; p=[0.000]		0.395; p=[0.000]		0.485; p=[0.000]		0.166; p=[0.125]		0.322; p=[0.000]	
Wald statistic χ <sup>2</sup> (d) ; p value	281.9; p=[0.000]		237.9; p=[0.000]		117.8; p=[0.000]		205.8; p=[0.000]		197.2; p=[0.000]		42.9; p=[0.645]		275.4; p=[0.000]	
OBSERVATIONS	4,225													
PANEL B SAMPLE=COUPLES MEAN BIG5 OF HEAD	HOLDING DEBT		HOLDING DEBT ABOVE £MEDIAN		HIRE PURCHASE		PERSONAL LOAN		CREDIT CARD		PRIVATE INDIVIDUAL		OTHER DEBT	
	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat
Conscientiousness	-0.0280	(2.53)	-0.0189	(2.00)	-0.0055	(0.72)	-0.0162	(1.59)	-0.0268	(2.60)	-0.0028	(1.48)	-0.0119	(1.61)
Extraversion	0.0306	(2.84)	0.0116	(1.27)	0.0088	(1.17)	0.0261	(2.66)	0.0181	(1.81)	0.0009	(0.55)	0.0133	(1.84)
Agreeableness	0.0286	(2.70)	0.0222	(2.46)	0.0098	(1.31)	0.0202	(2.07)	0.0049	(0.50)	0.0052	(1.98)	0.0013	(0.19)
Neuroticism	0.0106	(0.97)	0.0100	(1.08)	0.0186	(2.46)	0.0008	(0.08)	0.0168	(1.66)	0.0014	(0.83)	0.0028	(0.39)
Openness to experience	0.0130	(1.18)	0.0028	(0.30)	0.0034	(0.45)	-0.0057	(0.56)	0.0316	(3.05)	0.0029	(1.52)	0.0032	(0.43)
ρ; p value	0.423; p=[0.000]		0.354; p=[0.000]		0.204; p=[0.000]		0.395; p=[0.000]		0.490; p=[0.000]		0.207; p=[0.121]		0.323; p=[0.000]	
Wald statistic χ <sup>2</sup> (d); p value	273.3; p=[0.000]		234.4; p=[0.000]		117.1; p=[0.000]		203.9; p=[0.000]		189.2; p=[0.000]		38.3; p=[0.822]		275.2; p=[0.000]	
OBSERVATIONS	4,225													
PANEL C SAMPLE=SINGLES MEAN BIG5 OF HEAD	HOLDING DEBT		HOLDING DEBT ABOVE £MEDIAN		HIRE PURCHASE		PERSONAL LOAN		CREDIT CARD		PRIVATE INDIVIDUAL		OTHER DEBT	
	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat
Conscientiousness	-0.0337	(2.48)	-0.0163	(1.59)	0.0110	(1.72)	-0.0099	(1.06)	-0.0068	(0.71)	-0.0006	(0.78)	-0.0158	(1.87)
Extraversion	0.0307	(2.35)	0.0144	(1.50)	0.0027	(0.44)	0.0151	(1.71)	0.0130	(1.45)	-0.0002	(0.33)	0.0244	(2.88)
Agreeableness	0.0168	(1.27)	0.0086	(0.88)	-0.0178	(2.92)	-0.0036	(0.40)	-0.0038	(0.42)	0.0005	(0.72)	0.0004	(0.05)
Neuroticism	0.0121	(0.92)	0.0039	(0.40)	0.0013	(0.21)	-0.0008	(0.09)	0.0216	(2.34)	0.0001	(0.27)	0.0156	(1.87)
Openness to experience	0.0335	(2.45)	0.0337	(3.25)	-0.0040	(0.63)	0.0281	(2.95)	0.0272	(2.81)	0.0001	(0.24)	0.0032	(0.37)
ρ; p value	0.379; p=[0.000]		0.381; p=[0.000]		0.214; p=[0.005]		0.378; p=[0.000]		0.483; p=[0.000]		0.616; p=[0.000]		0.397; p=[0.000]	
Wald statistic χ <sup>2</sup> (d); p value	160.3; p=[0.000]		188.6; p=[0.000]		70.5; p=[0.003]		138.4; p=[0.000]		115.9; p=[0.000]		18.7; p=[0.999]		190.9; p=[0.000]	
OBSERVATIONS	2,915													

Data is an unbalanced panel from the British Household Panel Survey in 1995, 2000 and 2005. The sample of couples constitutes the head of household and their spouse, whilst the sample of single individuals relates to a household comprising a single adult who is the head of household. Each of the personality traits has been conditioned on a polynomial in age to net out life cycle influences. The resulting personality trait is based on the standardised residual from this process, i.e. zero mean and unit standard deviation. In Panel A the personality trait is based on the mean in the couple, whilst in Panels B and C the personality trait relates to that of the head of household. The dependent variables in Panels A and B are the type of debt held by the couple, whilst in Panel C the dependent variables are type debt held by the head of household. Estimates are based on a random effects probit incorporating Mundlak fixed effects. d=47 in the couples sample and 43 in the singles sample. The control variables (not reported here for brevity) are as in Table 2A. Marginal effects are reported throughout. T-statistics are reported in parenthesis.

**TABLE 4:** Probit Analysis with Mundlak Fixed Effects: Financial Asset Holding

PANEL A SAMPLE=COUPLES MEAN BIG5 WITHIN COUPLE	HOLDING ASSETS		HOLDING ASSETS ABOVE £MEDIAN		NATIONAL SAVINGS		PREMIUM BONDS		UNIT TRUSTS		PERSONAL EQUITY PLANS		SHARES	
	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat
Conscientiousness	-0.0092	(0.74)	-0.0043	(0.55)	-0.0002	(0.36)	-0.0030	(0.25)	0.0076	(1.75)	0.0003	(0.05)	0.0042	(0.38)
Extraversion	-0.0259	(2.20)	-0.0119	(1.63)	-0.0011	(1.40)	-0.0121	(1.07)	0.0038	(0.96)	-0.0085	(1.27)	-0.0187	(2.78)
Agreeableness	0.0111	(0.95)	0.0082	(1.10)	0.0002	(0.44)	-0.0018	(0.16)	-0.0027	(0.69)	0.0013	(0.19)	-0.0085	(0.81)
Neuroticism	0.0054	(0.47)	0.0057	(0.78)	0.0005	(0.82)	-0.0004	(0.04)	-0.0002	(0.04)	-0.0001	(0.01)	-0.0100	(0.97)
Openness to experience	0.0308	(2.57)	0.0069	(0.90)	0.0002	(0.37)	0.0164	(1.42)	-0.0056	(1.37)	-0.0033	(0.48)	0.0237	(2.20)
ρ; p value	0.512; p=[0.000]		0.422; p=[0.000]		0.682; p=[0.000]		0.712; p=[0.000]		0.547; p=[0.000]		0.423; p=[0.000]		0.642; p=[0.000]	
Wald statistic χ <sup>2</sup> (d) ; p value	280.3; p=[0.000]		293.1; p=[0.000]		51.4; p=[0.318]		168.1; p=[0.000]		145.3; p=[0.000]		280.1; p=[0.000]		241.2; p=[0.000]	
OBSERVATIONS	4,225													
PANEL B SAMPLE=COUPLES MEAN BIG5 OF HEAD	HOLDING ASSETS		HOLDING ASSETS ABOVE £MEDIAN		NATIONAL SAVINGS		PREMIUM BONDS		UNIT TRUSTS		PERSONAL EQUITY PLANS		SHARES	
	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat
Conscientiousness	-0.0001	(0.01)	-0.0097	(1.27)	-0.0003	(0.55)	-0.0035	(0.30)	0.0066	(1.58)	-0.0026	(0.37)	-0.0059	(0.54)
Extraversion	-0.0217	(1.88)	-0.091	(1.25)	-0.0006	(1.06)	-0.0124	(1.12)	0.0170	(0.44)	-0.0028	(0.42)	-0.0138	(1.33)
Agreeableness	0.0144	(1.26)	0.0066	(0.91)	0.0002	(0.39)	0.0020	(0.18)	0.0005	(0.14)	-0.0024	(0.36)	-0.0029	(0.28)
Neuroticism	0.0178	(1.52)	0.0114	(1.54)	0.0004	(0.75)	0.0009	(0.08)	0.0027	(0.67)	0.0037	(0.54)	-0.0039	(0.37)
Openness to experience	0.0168	(1.40)	0.0075	(0.98)	0.0002	(0.49)	0.0100	(0.87)	-0.0008	(0.19)	-0.0007	(0.10)	0.0203	(1.89)
ρ; p value	0.510; p=[0.000]		0.422; p=[0.000]		0.688; p=[0.000]		0.712; p=[0.000]		0.546; p=[0.000]		0.422; p=[0.000]		0.640; p=[0.000]	
Wald statistic χ <sup>2</sup> (d); p value	280.2; p=[0.000]		293.5; p=[0.000]		48.5; p=[0.411]		167.8; p=[0.000]		144.9; p=[0.000]		279.4; p=[0.000]		241.4; p=[0.000]	
OBSERVATIONS	4,225													
PANEL C SAMPLE=SINGLES MEAN BIG5 OF HEAD	HOLDING ASSETS		HOLDING ASSETS ABOVE £MEDIAN		NATIONAL SAVINGS		PREMIUM BONDS		UNIT TRUSTS		PERSONAL EQUITY PLANS		SHARES	
	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat	ME	t-stat
Conscientiousness	-0.0164	(1.57)	-0.0067	(1.08)	-0.0011	(0.59)	-0.0101	(1.90)	-0.0036	(1.00)	0.0051	(0.87)	0.0047	(0.62)
Extraversion	-0.0057	(0.59)	-0.0001	(0.02)	-0.0012	(0.51)	-0.0012	(0.26)	0.0039	(1.18)	0.0056	(1.06)	-0.0038	(0.55)
Agreeableness	-0.0082	(0.84)	-0.0090	(1.56)	-0.0012	(0.74)	-0.0004	(0.08)	0.0024	(0.72)	-0.0059	(1.11)	-0.0144	(2.02)
Neuroticism	-0.0067	(0.67)	-0.0025	(0.43)	0.0001	(0.06)	-0.0015	(0.31)	-0.0001	(0.03)	0.0064	(1.20)	0.0018	(0.25)
Openness to experience	0.0135	(1.31)	-0.0029	(0.48)	-0.0016	(0.75)	0.0064	(1.22)	0.0001	(0.04)	-0.0014	(0.26)	0.0054	(0.74)
ρ; p value	0.558; p=[0.000]		0.537; p=[0.000]		0.701; p=[0.000]		0.815; p=[0.000]		0.512; p=[0.000]		0.474; p=[0.000]		0.627; p=[0.000]	
Wald statistic χ <sup>2</sup> (d); p value	170.3; p=[0.000]		119.2; p=[0.000]		30.3; p=[0.522]		95.1; p=[0.000]		64.4; p=[0.029]		102.4; p=[0.000]		129.3; p=[0.000]	
OBSERVATIONS	2,915													

Data is an unbalanced panel from the British Household Panel Survey in 1995, 2000 and 2005. The sample of couples constitutes the head of household and their spouse, whilst the sample of single individuals relates to a household comprising a single adult who is the head of household. Each of the personality traits has been conditioned on a polynomial in age to net out life cycle influences. The resulting personality trait is based on the standardised residual from this process, i.e. zero mean and unit standard deviation. In Panel A the personality trait is based on the mean in the couple, whilst in Panels B and C the personality trait relates to that of the head of household. The dependent variables in Panels A and B are the type of financial asset held by the couple, whilst in Panel C the dependent variables are type financial asset held by the head of household. Estimates are based on a random effects probit incorporating Mundlak fixed effects. d=47 in the couples sample and 43 in the singles sample. The control variables (not reported here for brevity) are as in Table 2A. Marginal effects are reported throughout. T-statistics are reported in parenthesis.

## **Appendix A: Stability of Personality Traits**

Following Cobb-Clark and Schurer (2013), we have investigated the stability of personality traits in our two samples. It is possible to match our BHPS samples to wave three (2011-2012) of Understanding Society, which also provides information on the Big Five personality traits. Out of the 2,595 (1,966) couples (singles), we are able to follow 1,164 (863) couples (singles) to wave 3 of Understanding Society. This enables us to construct measures of the change in each Big Five personality trait as follows:  $\Delta_j = T_{j,2012} - T_{j,2005}$ , where  $T_j$  is a personality trait, i.e. one of the Big Five ( $j=1,\dots,5$ ). In 2005 and 2011-2012, each of the Big Five are measured on a seven point scale, hence the change,  $\Delta_j$ , ranges from -6 to 6. The upper panel of Table A1 focuses on the couples sample and the lower panel is for single heads of household in 2005. The first two columns focus on the level of the Big Five showing the mean of each personality trait in 2005 and 2011-2012, respectively. The remaining columns present changes in the personality traits over time. Columns 3 to 5 show changes in the mean value of each personality trait over the period, the standard deviation and the percentage change, respectively. With the exception of neuroticism, evaluated at the mean, each trait has become more pronounced over time. However, the proportional change in each element of the Big Five is relatively small, below 5% with the exception of conscientiousness. The remaining columns of Table A1 show changes at different points in the distribution and reveal that changes in specific personality traits at the median are zero and half of the cases experience a change in their Big Five traits of at most 0.67 points. The change in each trait between 2005 and 2011-2012 is also approximately normally distributed with a zero mean and standard deviation of unity. The summary evidence provided in Table A1 suggests that personality traits are stable lending some support for interpreting the Big Five personality traits as exogenous in the context of our empirical analysis.

**TABLE A1:** Summary Statistics – Raw Personality Traits Over Time

<u>A: COUPLES SAMPLE</u>	LEVEL		CHANGES BETWEEN 2005 AND 2012							
	Mean		Mean	Std.	% Δ	PERCENTILE OF DISTRIBUTION				
	2005	2012				1 <sup>st</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	99 <sup>th</sup>
Conscientiousness	2.801	2.885	0.084	0.982	6.91%	-2.667	-0.333	0	0.667	2.667
Extraversion	4.492	4.589	0.097	0.936	4.70%	-2.333	-0.333	0	0.667	2.667
Agreeableness	5.464	5.606	0.142	0.926	4.55%	-2.333	-0.333	0	0.667	2.333
Neuroticism	3.728	3.578	-0.184	1.053	1.02%	-3.000	-0.667	0	0.333	2.667
Openness to experience	4.539	4.501	-0.021	1.002	3.00%	-2.667	-0.667	0	0.667	2.333
<u>B: SINGLES SAMPLE</u>	LEVEL		CHANGES BETWEEN 2005 AND 2012							
	Mean		Mean	Std.	% Δ	PERCENTILE OF DISTRIBUTION				
	2005	2012				1 <sup>st</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	99 <sup>th</sup>
Conscientiousness	2.666	2.734	0.068	1.106	7.41%	-3.000	-0.333	0	0.999	3.000
Extraversion	4.431	4.468	0.037	1.112	3.74%	-3.000	-0.667	0	0.667	3.000
Agreeableness	5.439	5.590	0.151	0.998	4.75%	-2.667	-0.333	0	0.667	2.667
Neuroticism	3.968	3.797	-0.171	1.164	0.13%	-3.000	-0.667	0	0.667	3.000
Openness to experience	4.421	4.461	0.040	1.160	4.63%	-3.000	-0.667	0	0.667	3.000

Data are from the British Household Panel Survey (BHPS) 2005 and Understanding Society (US) 2011-2012. In Panel A of the table a sample of 1,164 couples in the 2005 BHPS are followed through to 2011-2012 in US, whilst in Panel B a sample of 863 singles from the BHPS in 2005 are followed through to 2011-2012 in US. The first two columns show the mean in each of the Big Five personality traits in 2005 and 2011-2012 whilst the remaining columns show how the personality traits have changed over time in the first and second moments, also showing the absolute percentage change denoted by |% Δ| over the period, and changes across different points of the distribution.